

XENON TIMING LIGHT

OPERATING INSTRUCTIONS

8000-1308

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
WHAT IS TIMING	1
WHEN TO CHECK TIMING	3
TIMING SPECIFICATIONS	4
PREPARATION FOR TIMING	4
ADJUSTING TIMING TO SPECIFICATIONS	6
TESTING CENTRIFUGAL ADVANCE	8
TESTING VACUUM ADVANCE	8
CHECKING DISTRIBUTOR CAM WEAR	9
SMALL ENGINES	10
ROTARY ENGINES	10
TROUBLE SHOOTING YOUR TIMING LIGHT	12
TROUBLE SHOOTING PROCEDURE	13
XENON LAMP REPLACEMENT	13
INSTALLING XENON LAMP	13, 14, 15, 16
WARRANTY POLICY	17
REGISTRATION CARD	18

INTRODUCTION

Congratulations, you are now the owner of one of the finest Timing Lights on the market today. If you will take a few moments to read through the following information we are sure that you will enjoy many years of service from your Timing Light and through its use increase the efficiency of your car's engine.

The special "Xenon" bulb used in these lights will provide the ultrabright flash needed to see engine timing marks under most bright lighting conditions, even during normal daylight. In several models the bulb can be replaced by the user when needed reducing the need to return the light to the factory for service.

WHAT IS TIMING?

In order for an automobile engine to function, three things are necessary: air, fuel and a spark to ignite the air/fuel mixture and create an explosion. The precise instant of that explosion must be such that the maximum power is delivered to the engine piston, this is "Timing." Each engine manufacturer determines at the factory the exact timing necessary for various engines so that each ounce of power is obtained from every gallon of fuel. Due to normal engine and ignition system wear, the timing can change and will reduce both power and mileage. With the Hawk timing light, the car owner can reset the timing to the new car standards and regain lost power and increase mileage.

Timing is given in degrees Before Top Dead Center (BTDC) or After Top Dead Center (ATDC) in the manufacturer's specifications. In order to completely burn the air/fuel mixture in the car's engine cylinders, most timing is such that the spark occurs at a point several degrees before top dead center (for example, 4° BTDC) to assure that full power of the explosion is obtained. See Figure 1.

(Cont'd on page 3)

ENGINE TIMING SETTINGS

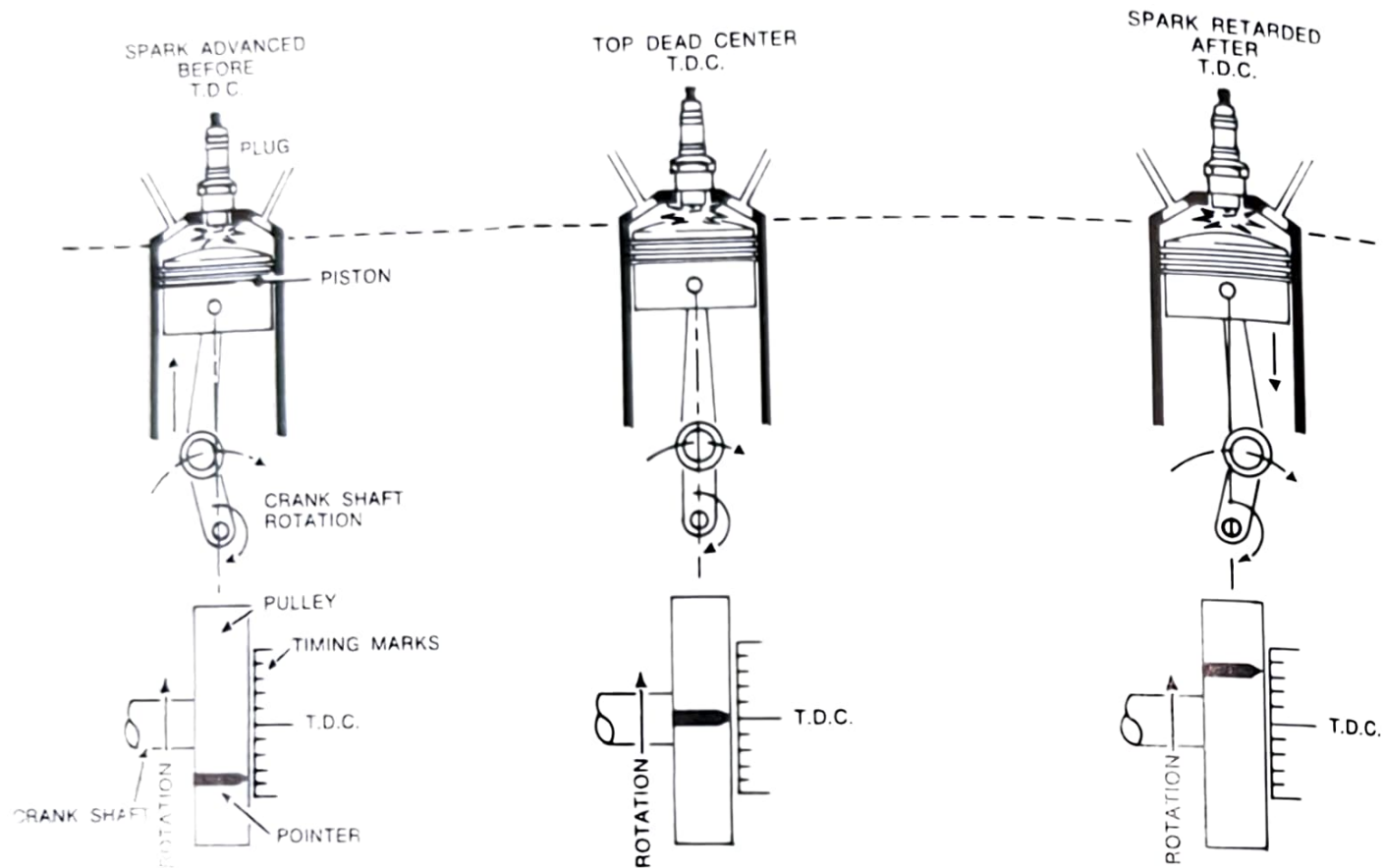


Figure 1

Two additional terms the engine manufacturers use when describing timing are "Advanced" and "Retarded". As shown in Figure 1, when the timing is advanced the spark will occur before the piston reaches the top of the engine cylinder (BTDC). On some late model cars equipped with various emission control devices, the timing is retarded so that the spark occurs after the piston has started down in the cylinder (ATDC). Engine timing is changed by adjustment of the ignition distributor.

In order to allow setting and adjustment of the engine timing, special "Timing Marks" are provided on each engine during assembly. In most cases, these marks appear on the engine vibration damper or fan pulley at the lower front of the engine. See Figure 1. On some early engines this mark was shown at the rear of the engine on the flywheel.

WHEN TO CHECK TIMING

The instant of spark plug firing is determined by the opening of the distributor ignition breaker points and will change any time the point gap or Dwell angle is changed. In addition, normal wear on the breaker point rubbing block will change the dwell and affect the timing. While cars equipped with the new "breakerless Electronic Ignition Systems" will not normally change timing since there are no breaker points, the timing light can still be used to note changes in timing caused by troubles in the ignition system as well as for resetting timing when components are changed.

TIMING SPECIFICATIONS

As noted in earlier paragraphs, timing requirements vary from engine to engine and for this reason the engine manufacturers specifications should always be referred to before making any adjustments. These specifications are contained in the car owners manual, on the underhood decal required on all cars manufactured since 1968 and in various publications printed by such companies as "Motor", "Chilton", "Petersen" and others. Many spark plug manufacturers such as "Champion", "Autolite" and others also provide specifications.

PREPARATION FOR TIMING:

1. Locate engine timing mark (see figure 1) and use a rag to clean all grease and dirt from the mark and the pointer. It may help to use chalk or white paint on the marks to make them more easily seen.
2. Check manufacturers specifications for correct timing for engine being serviced.
3. Start and run engine until normal operating temperature is reached. Approximately 15 minutes. Stop engine.
4. If specifications require, locate the vacuum line going to the ignition distributor vacuum advance and disconnect and plug the line. A golf tee or small pencil may be used to seal the line.
5. Connect the timing light as shown in figure 2.

(Cont'd on page 6)

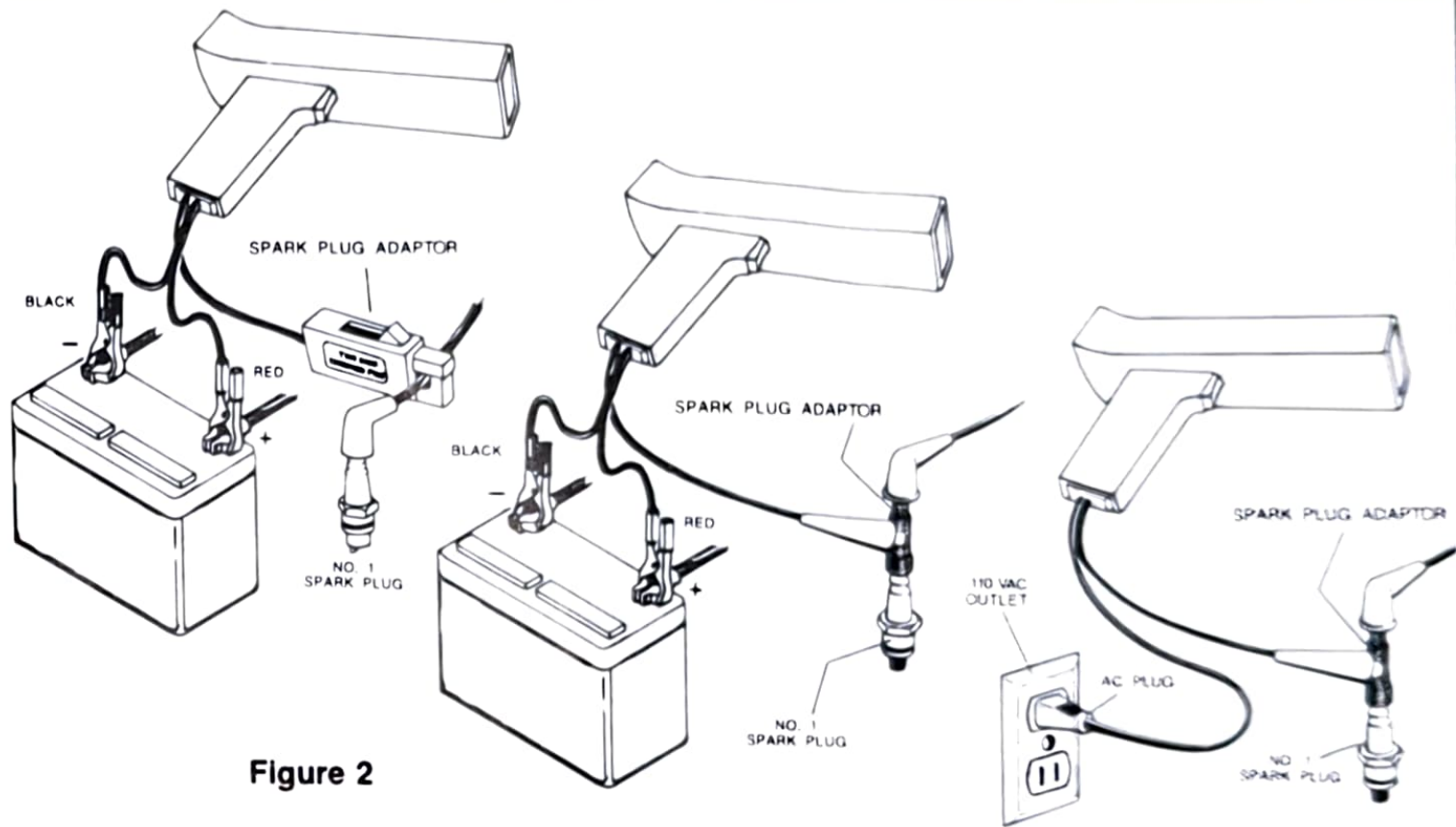


Figure 2

NOTE: The timing light must be connected to spark plug for engine cylinder number 1. Refer to manufacturers specifications to determine proper plug for your car.

6. Start engine and operate at normal idle speed. See figure 4.
7. Direct flash from timing light onto engine timing marks and note reading.

CAUTION: Use care when working around moving engine. The action of the "Stroboscopic" flash from the timing light has the effect of stopping or "Freezing" motion. Use care to keep hands, tools and timing light clear of moving fan, belts or other moving parts.

8. Compare reading obtained in step 7 with manufacturers specifications. If timing is not as specified readjust as described in the following procedure. Stop engine.

ADJUSTING TIMING TO SPECIFICATIONS:

1. Loosen distributor holddown locking bolt located at base of distributor enough so that distributor may be rotated back and forth. Do not overloosen or remove bolt but leave tight enough to prevent distributor from turning by itself.
2. Start and run engine.
3. Direct timing light flash at timing marks and slowly rotate distributor right and left until timing marks are aligned with pointer. See figure 4. Stop engine.
4. Tighten distributor holddown bolt using care not to change position of distributor.
5. Start engine and recheck timing.

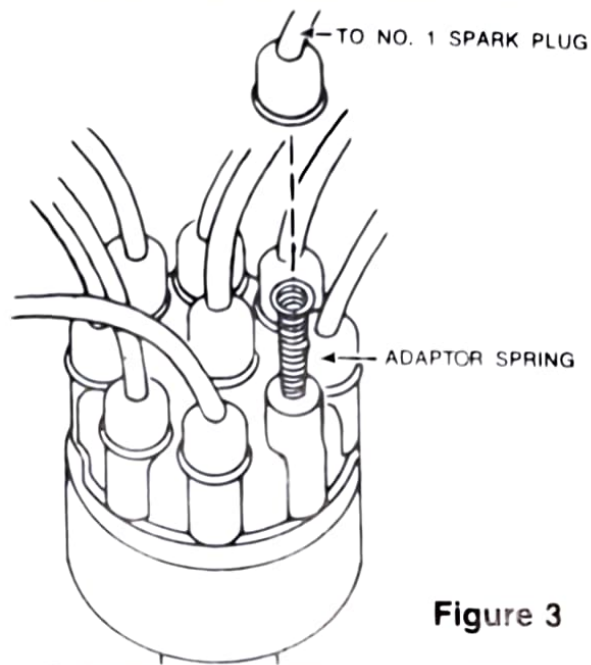


Figure 3

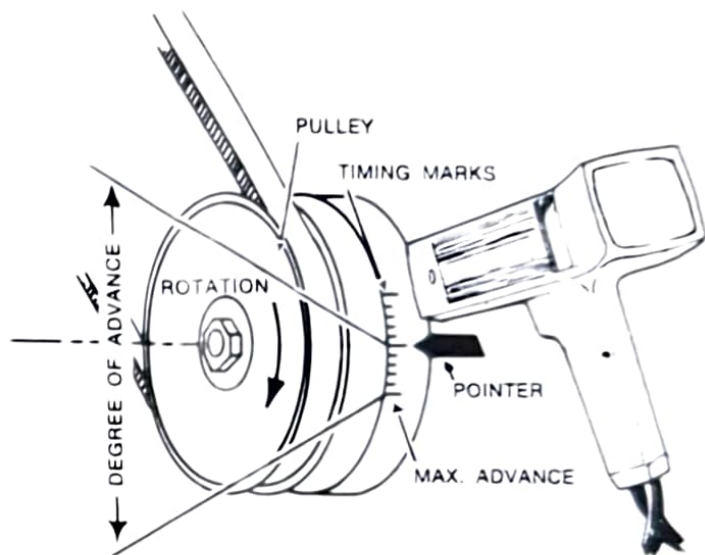


Figure 4

NOTE:

In some cases the ignition spark may jump to the engine block or baffle. This may occur on those engines such as late model Ford 8-cylinders where the timing light adaptor spring is too close to engine metal parts. In such cases, trace the wire from the spark plug to the distributor cap. Disconnect the wire at the cap and install the adaptor spring as shown in figure 3.

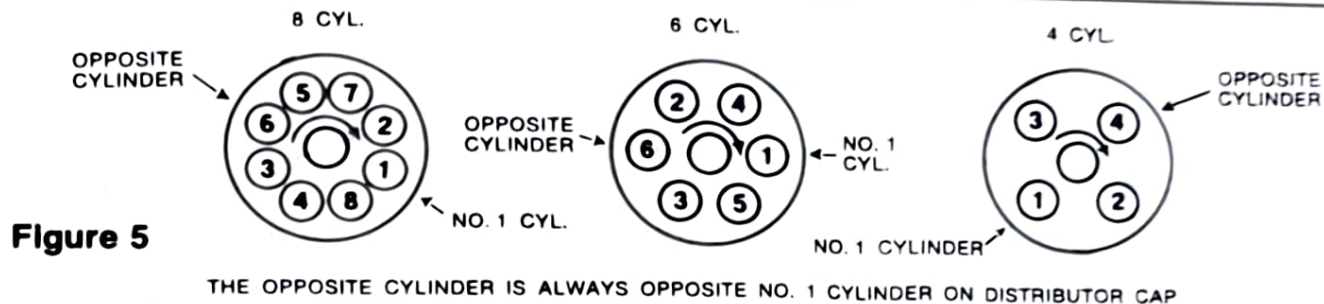
TESTING CENTRIFUGAL ADVANCE

With the timing light still connected and with the vacuum line disconnected:

1. Speed the engine up slowly and watch the timing mark.
2. The timing mark should remain stationary until the engine reaches the manufacturer's specified speed. The timing mark should then move steadily and without jerking. (See figure 4.)
3. If the mark does not move, or if it moves erratically, the centrifugal (automatic) advance should be serviced as necessary.
4. To check the maximum advance, it is necessary to mark the harmonic balancer with the maximum degree per manufacturer's specifications and follow manufacturer's procedures.

TESTING VACUUM ADVANCE

1. The vacuum line to the distributor must be connected to make this test.
2. Set engine speed to 800 R.P.M. or speed necessary to apply vacuum to distributor.
3. Aim the timing light and note position of the timing mark.
4. Disconnect vacuum line.
5. If the timing mark does not move, the trouble could be a plugged line, a leaky diaphragm or a frozen distributor plate, and the distributor should be serviced as required.



CHECKING DISTRIBUTOR CAM WEAR

1. This check is done after the timing has been set and the timing mark lines up with the reference pointer for #1 cylinder.
2. Connect the timing light to the wire directly opposite (180°) #1 cylinder on the distributor cap. (See figure 5.)
3. Start engine and aim the timing light towards the timing mark. The reading should be the same as when connected to #1 cylinder.
4. If reading is not the same, probable cause is worn out distributor cam or bent distributor shaft. Repair as required.

SMALL ENGINES

The DC Power Timing Light can be used on any combustion engine with impulse ignition, magneto ignition, such as motorcycles, lawn mowers, outboard motors, or any time there is a high voltage spark used for ignition.

When 12 Volt DC voltage is not available from the engine being tested, an external battery of 12 V must be used. Connect a ground from the negative post of the external battery to the engine. Connect the red clip to the (+) positive terminal and the black clip to the (-) negative terminal of the battery. Connect the adaptor lead of the timing light to the proper spark plug.

ROTARY ENGINE

The Timing Light can be used on Rotary engines. Follow the manufacturer's specific instructions and specifications. Below is a typical procedure for the Mazda twin rotor engine.

1. Connect the Red and Black power leads clamps to the battery. Connect wire with the spark plug adaptor to the leading spark plug on the front rotor housing.
2. Start the engine and run at idle speed.
3. Aim the timing light at the timing indicator pin on the front cover.
4. Loosen the distributor locking nuts and rotate the leading side distributor body until the timing mark on the eccentric shaft pulley are in line with the timing indicator pin.

5. Tighten the locking nuts and recheck the timing.
6. Repeat the above step for setting the trailing side distributor timing with the timing light connected to the trailing spark plug.

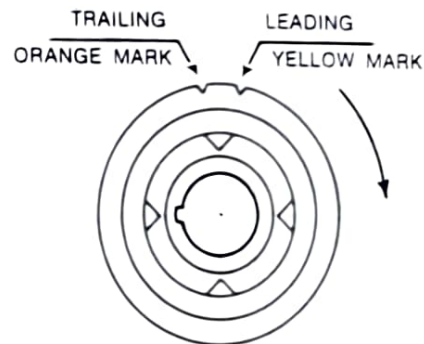
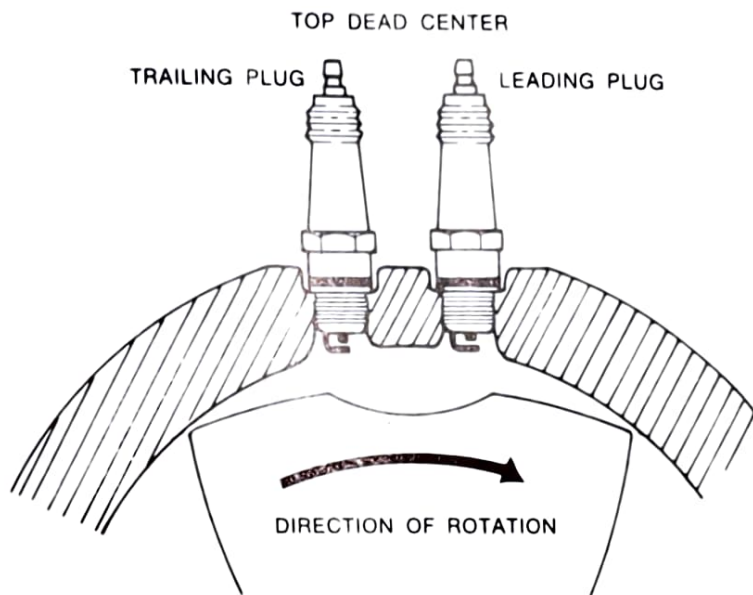


Figure 6

SYMPTOM	PROBABLE CAUSE	SOLUTION
LIGHT DOES NOT FLASH	Switch in "OFF" position.	Move switch to "ON" position.
	Battery clips connected backward.	Reverse the battery clip connections.
	Battery clips not making good connection.	Make sure grounded clip is connected to a clean ground.
	No. 1 spark plug fouled.	Try connecting to the spark plug of another cylinder (to check for flash only.)
	Weak ignition or spark plug gap too close.	Try connected to the spark plug of another cylinder or wire (to check for flash only.)
LIGHT FLASHES INTERMITTENTLY	Timing light high-tension wire lying on or too close to the other spark plug wires.	Connect the high tension wire to the #1 spark plug so it is routed away from the other spark plug wires.

TROUBLE SHOOTING PROCEDURE

All timing lights are tested 100% before they are shipped from the factory and improper operation is usually caused by incorrect hook-up. Please observe the following trouble shooting procedure if the timing light fails to perform satisfactorily.

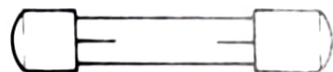
XENON BULB REPLACEMENT

If procedures outlined in the table do not correct the failure, the most probable cause is a defective Xenon lamp.

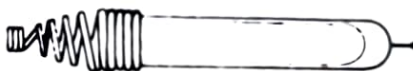
The lamp may have a black spot around the anode, this is perfectly normal. However, if the lamp is completely black it has reached its end of life and should be replaced.

The Xenon lamps can be different for different model timing lights, so replacement bulbs should be ordered by the *part number* given in Figure 7.

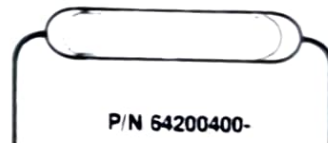
You may order replacement bulbs directly from the factory — Attention: Consumer Service.



P/N 64200600-



P/N 64200200-



P/N 64200400-

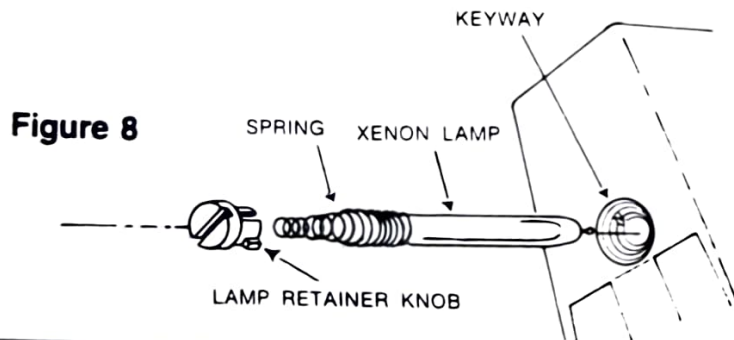
Types of Xenon Bulbs

Figure 7

INSTALLING XENON LAMP

There are several different bulbs used in these Timing Lights and each is removed and installed differently. To replace a bulb in those timing lights which have the bulb inserted into the side of the housing proceed as outlined under Figure 8. For timing lights without the removable bulb holder proceed as outlined under Figure 9.

1. When changing Xenon Lamp, be sure timing light is disconnected.
2. Remove Xenon Lamp by turning the lamp retainer cap one quarter turn in either direction. Remove lamp by pulling straight out on the spring. (See Figure 8.)
3. Insert the new lamp straight into the timing light. If resistance is encountered before lamp is completely inside the timing light, remove lamp and install again.
4. Install lamp retainer cap, making sure the spring locating tab is inside the spring. Line up the index tabs on the lamp retainer cap with the key way in the timing light and push the retainer cap into the timing light case. Turn the retainer cap one quarter turn.



1. When changing the Xenon Bulb, be sure timing light is disconnected from the power source.
2. Lay the timing light on its left side and remove the four (4) screws holding the case halves together, see Figure 9. (NOTE: After carefully removing top case half, note the internal arrangement of wires and components so you can properly reassemble the timing light after replacing the Xenon Bulb.)

(Cont'd. on page 16)

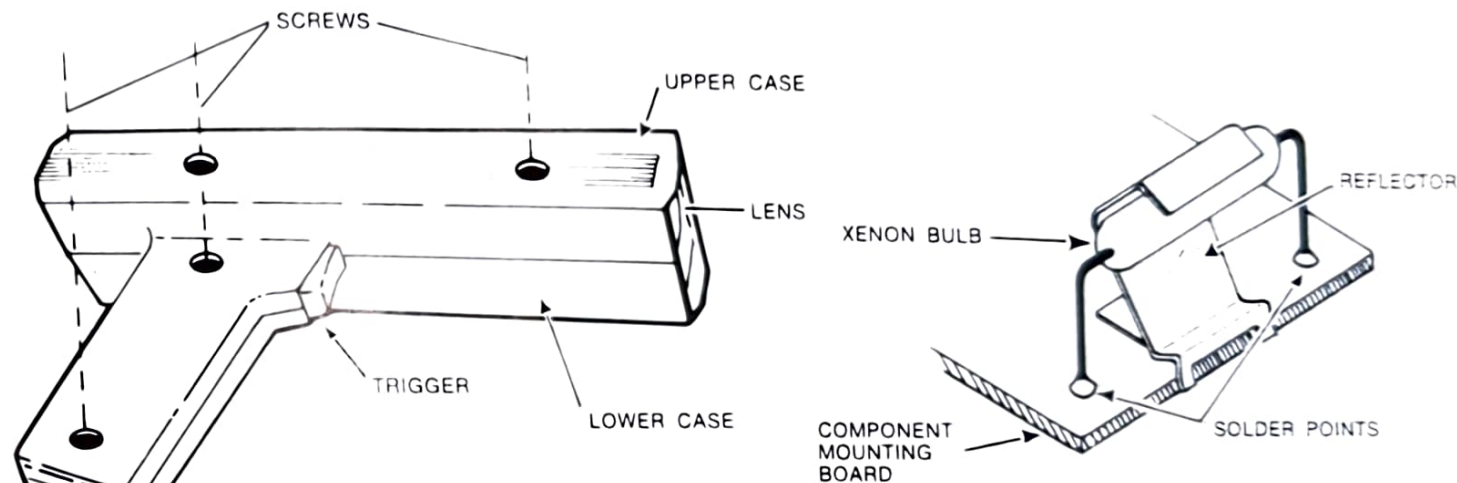


Figure 9

(Cont'd on page 16)

3. Remove component mounting board from the lower case half and locate the Xenon Bulb, see Figure 9.
4. Using a soldering iron or gun carefully, one lead at a time, disconnect the bulb leads from the mounting board at the indicated solder points.
5. Remove the old bulb from within the reflector and carefully install the new Xenon Bulb in the same manner.
6. With fresh solder, solder the new bulb leads to the mounting board solder points and trim excess bulb leads as required.
7. Reinsert component mounting board and wires into lower case half.
8. Replace upper case half making sure lens and trigger are correctly positioned.
9. Reinstall the four (4) screws to complete the timing light reassembly.

LIMITED WARRANTY

(Xenon Bulb NOT covered by this warranty)

Warranty Administrator, 23011 S. Wilmington Ave., Carson, Calif. 90745, hereby warrants, subject to the terms and conditions set forth below, that for a period of five years from the date of original purchase at retail (the Warranty Period) it will replace any product manufactured by it which proves to be defective under normal use and service in workmanship or material.

The Warranty Administrator's obligation under this Warranty is limited to the repair or replacement of the product, at its option, without charge for parts or labor at its plant located at the above address in Carson, Calif. when the product is returned to the factory with shipping charges prepaid and examination of the product shall disclose it to have been defective in the respects aforesaid during the Warranty Period. The repairs or replacement will be made promptly and in any event, within not more than fifteen (15) regular business days after receipt of the unit at the factory of the Warranty Administrator. No warranty services will be performed on Saturdays or after 4:30 P.M. local time on other business days.

The Warranty Administrator will return the repaired or replaced unit with shipping charges prepaid.

Coverage under this warranty is limited to the original purchaser of the product at retail. When requesting warranty service, proof of date of purchase must be submitted. The sales receipt or copy may be used for this purpose.

This warranty does not apply to any product which has been repaired or altered in any manner by anyone other than the Warranty Administrator, or if the defect, malfunction or failure of the product to conform to this Warranty was caused by damage (not resulting from defect or malfunction) while in the possession of the purchaser or from unreasonable use or from improper installation or application or to any product which has not been maintained or used in accordance with the operating specifications set forth in the Warranty Administrator's written instructions.

The Warranty Period shall not be extended beyond its original term with respect to any part or parts repaired or replaced by the Warranty Administrator.

Implied warranties of merchantability or fitness for any particular purpose are limited in duration to the five year Warranty Period specified above except in the following states in which such limitation is unenforceable: California, West Virginia, Massachusetts, Maryland, Washington, Oregon, Maine.

Under no circumstances shall the Warranty Administrator be liable for any consequential damages for breach of this Warranty or of any implied warranty.

Warranty Administrator neither assumes nor authorizes any person to assume for it any obligation or liability other than as herein expressly stated.

WARRANTY ADMINISTRATOR, 23011 S. Wilmington Ave., Carson, CA 90745

LIMITED WARRANTY REGISTRATION CARD

Name _____

Address _____

City, State, Zip _____

Item Purchased _____

Model No. _____ Date Purchased _____

1. Purchase was made by a ☐ Man ☐ Woman ☐ Over 18 ☐ Over 24 ☐ Over 32

2. What auto will you use it on?

☐ Stock ☐ Custom ☐ Make _____ Year _____ Model _____

3. Was the purchase ☐ A regular purchase ☐ A gift

4. What called your attention to the product?

☐ Magazine ad ☐ Store display ☐ Friend or relative
☐ Newspaper ☐ Radio ☐ Catalog ☐ Sales clerk ☐ Saw one like it

5. From what kind of store was the item purchased? ☐ Speed Shop ☐ Discount ☐ Auto Supply
☐ Garage ☐ Service Station ☐ Auto Dealer ☐ Military (P.X., etc.) ☐ Other _____

6. Have you ever owned this kind of instrument before?

If so, what brand? _____

7. Comments _____